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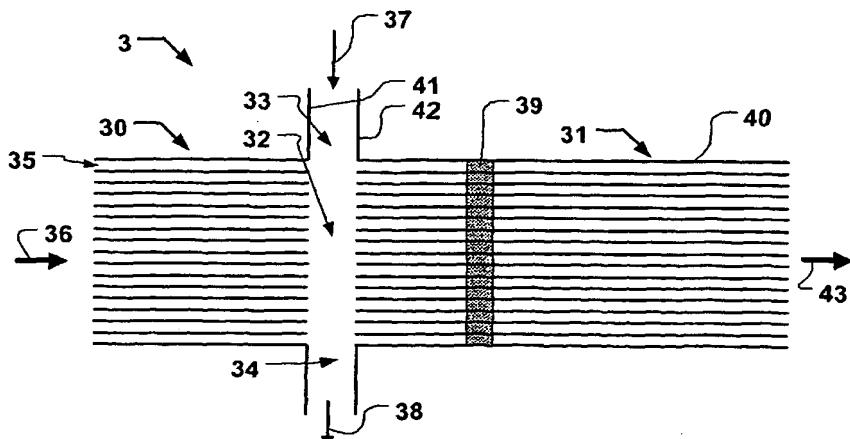
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(54) Title: FLUID PARTITIONING IN MULTIPLE MICROCHANNELS



(57) Abstract: A device (3) and method to generate independent fluid samples (51) for multichannel analysis, preferably in diagnostic cartridges, are disclosed according to the invention. A fluidic device (3), preferably a microfluidic device, has a plurality of fluid channels (35). Fluids are transported in the fluid channels. A cross-over channel (32) has a fluid inlet (33) and a fluid outlet (34). In use of said device (3), a method is performed. According to the method, the sample channels are filled with sample fluid up to a threshold (39). A flush fluid (gas or inert liquid) is then flushed through the sample-filled cross-over channel, replacing the sample fluid with flush fluid. Subsequently the cross-over channels' inlet and outlet are closed and the sample fluid is pushed further into the channel arrays (30, 31). Alternatively, an appropriate pressure is applied to the fluid in order to push the fluid into said sample channels. The method steps are repeated in an appropriate way if it is desired to obtain multiple (in time and/or space) independent sample plugs in the microchannels. Thus a series of longitudinally spaced independent sample fluid segments separated from each other by flush segments is created in each microchannel.

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# INTERNATIONAL SEARCH REPORT

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Minimum documentation searched (classification system followed by classification symbols)  
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 540 896 B1 (MANZ ANDREAS ET AL) 1 April 2003 (2003-04-01) column 2, line 66 - column 6, line 65; figures 1-3 column 9, line 27 - column 10, line 56 -----	1-8, 13-16
X	US 2002/195463 A1 (ENDO ISAO ET AL) 26 December 2002 (2002-12-26) paragraphs '0008! - '0032!; figures 5-11 -----	1-4, 6-9, 11-24
X	US 6 117 396 A (DEMERS ROBERT RICHARD) 12 September 2000 (2000-09-12) the whole document -----	1-4, 6-9, 11-24
A	US 2003/005967 A1 (KARP CHRISTOPH D) 9 January 2003 (2003-01-09) the whole document -----	1-24

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 6540896	B1	01-04-2003	US	2003124736 A1		03-07-2003
US 2002195463	A1	26-12-2002	JP	2002357616 A		13-12-2002
US 6117396	A	12-09-2000	AU	748500 B2		06-06-2002
			AU	2771999 A		06-09-1999
			CA	2321495 A1		26-08-1999
			EP	1058824 A1		13-12-2000
			JP	2002504677 T		12-02-2002
			WO	9942805 A1		26-08-1999
US 2003005967	A1	09-01-2003	WO	02083310 A2		24-10-2002
			US	2002166582 A1		14-11-2002